

RCA PD030234AD

CITED BY APPLICANT

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau(43) International Publication Date  
12 September 2002 (12.09.2002)

PCT

(10) International Publication Number  
WO 02/071197 A1(51) International Patent Classification<sup>7</sup>: G06F 3/00

HOLZHAUSER, Lisa; 3323 La Mesa Drive, #2, San Carlos, CA 94070 (US).

(21) International Application Number: PCT/US02/06470

(74) Agent: SCHMIT, Michael, E.; Philips Electronics North America Corp., 580 White Plains Road, Tarrytown, NY 10591 (US).

(22) International Filing Date: 4 March 2002 (04.03.2002)

(25) Filing Language:

English

(81) Designated States (national): CN, JP.

(26) Publication Language:

English

(84) Designated States (regional): European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR).

(30) Priority Data:

09/801,070

6 March 2001 (06.03.2001) US

Published:

— with international search report

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(71) Applicant: PHILIPS ELECTRONICS NORTH AMERICA CORPORATION [US/US]; 580 White Plains Road, Tarrytown, NY 10591 (US).

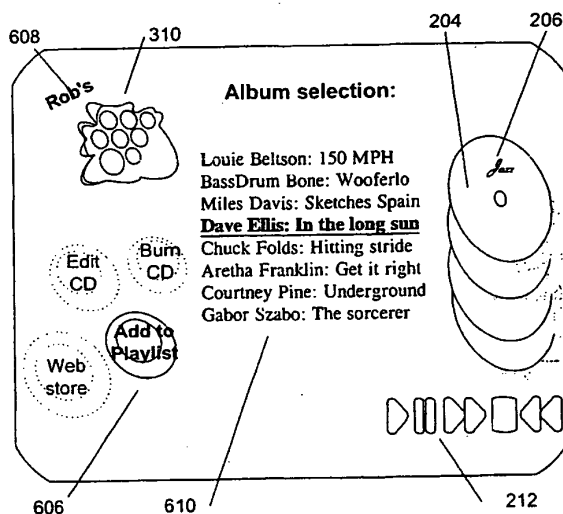
(72) Inventors: KUSANO, Mieko; 18 Whittier Street, Apt. 3, Cambridge, MA 02140 (US). LAMBOURNE, Robert; 18 Whittier Street, Apt. 3, Cambridge, MA 02140 (US).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Ruhend

unauffällig  
unaufmerksam

(54) Title: DORMANT GUI BUTTONS RESIDE UNOBTRUSIVELY IN THE BACKGROUND UPON SELECTION



(57) Abstract: The invention relates to a GUI (600) for enabling a user to navigate between a wide variety of options (204, 210). With the trend of offering more applications and options to the user, like in STB's deployed in a living room, it becomes evident to present the options in an intuitive and user friendly manner. Only user options are selectable, on e.g. a TV screen, which are currently of direct interest to the user. The user can navigate between these options using, e.g., a relative simple input device like a RC (100). Other options (306, 706) are shown semi visible in the background and are like in a dormant state. With e.g. a separate button on the input device these options can be made completely visible (606, 708) and can even be emphasized using, e.g., an animation on the screen. The invention is especially well suited for in a data driven applications environment.

BEST AVAILABLE COPY

WO 02/071197 A1

**Title:** Dormant GUI buttons reside unobtrusively in the background upon selection.

5 **Field of the invention:**

This invention relates to a Graphical User Interface (GUI) design suitable for applications on devices such as a Set Top Box (STB) and a PC. In particular the invention relates to a presentation and selection method of user selectable options using  
10 2.5D and 3D spatial effects.

**Background Art:**

In a STB the number of available Software-applications (SW) and user-selectable options are ever increasing in every new  
15 generation. Using buttons with focus and a Remote Control (RC), the user can select an option using, e.g., a moving highlight. As the number of options increases the user starts losing the overview. This problem only worsens when operating in an open networked environment where devices can be added or disconnected  
20 and where the GUI changes accordingly.

**Summary of the invention:**

The invention relates to a GUI design in which solutions are offered for dealing with an increased number of options while  
25 keeping it easy for the user to control the options.

This invention proposes a user-intuitive GUI design with easy-to-select options that let the user keep the overview, even with an extended functionality.

The communication between networked devices can be the  
30 responsibility of a STB in the network. The emphasis of the networked system will be on the content as perceived by the user and less on the devices themselves i.e., content-centric instead

of device-centric. In a networked environment it can be advantageous to collect data that is descriptive of content information available at various resources on the network. This data can be combined in a single menu to enable the user to select  
5 from the content, regardless of the resource.

The GUI design as of the current invention is very much suited to take advantage of the approach of a data management system, which can collect the data as described above. An example of such a data management system is described in patent  
10 application US S/N 09/568932 (attorney docket US 000106), incorporated by reference in its entirety herein.

Personalization of content and its contextual filtering are becoming more prevalent. The proposed GUI of the invention has been developed with content driven applications in mind.

15 Using the GUI design and approach of this invention, new components can easily be added in the GUI, such as a GUI representation of a newly attached networked device. Examples of SW-protocols for a network where attaching/detaching a device is allowed are HAVI, UPnP and Jini. Methods and rules for data-driven  
20 applications can apply to more than one device. If, e.g., the user wants to play a certain piece of music on his/her home entertainment system he/she is in general less interested from which device it originates. Therefore the graphical presentation of various playback functions can be the same for, e.g., an MP3  
25 player and a CD-player.

The invention is explained in more detail by using an example of a GUI for a virtual audio-jukebox application. The expression "virtual" in this context refers to that all the songs seem part of one-and-the-same audio-jukebox to the user. In reality the  
30 songs can reside in different physical devices such as a CD-player or an MP3-player. These players can be part of a (digital) networked home system. The application can easily be expanded to

include multiple forms of digital content (e.g. movies etc.). The GUI of the application is also able to present feedback to the user when he/she interacts with a physical object, as in this example a CD-player. The concrete notion of the physical CD-player is combined in the GUI with the abstract notion of digital information, in this case digital audio. Choosing a familiar metaphor (in this example a stack of CDs is used) simplifies the usability and structures the relationship between the medium (in this example music), the application and the user. The content and control can come however from different sources. The networked home system will typically have a certain degree of awareness of its networked devices.

A typical Television (TV) screen is considered as a device, which provides the visual user information. The GUI screenshots used to illustrate this invention have been made with a TV screen in mind. But the invention is also applicable to other types of screens, such as that of web-pads or hand-held devices. Since the user is typically located about 7 ~ 10 feet from the TV-screen (2 ~ 3 m) it is necessary that GUI objects are larger than those used on a computer screen. Therefore less effective space is available for the GUI and a deeper navigation structure is required. As a consequence the GUI is designed with only those tools prominently visible on the screen that are pertinent to the specific task the user is engaged in. The user can control the application using a simple 4-way directional remote control (with an "OK"- button for confirming a selection) and possibly another input device for text input (e.g., using a physical or virtual keyboard). This as opposed to a computer environment where a full-fledged keyboard and a mouse are commonly used as user control means. The invention however also applies to other types of user control means such as based on a joystick with a GUI cursor, speech, etc.

One aspect of the invention is the usage of a graphical emphasis on user options, which are currently relevant to the user and thus must have focus.

User options that have focus in this context mean those options that currently need the attention of the user, e.g., when the user has to choose one song out of a list of ten. In this example the ten songs have focus and get the graphical emphasis. For instance the graphical designer can make use of a higher contrast, a larger object size or more saturated colors or provide more (e.g., textual) information (or a combination of the before mentioned) for options that have focus. The graphical designer can also make use of 2.5D or 3D effects. For example, currently relevant options could be designed such that they appear to 'pop-out' of the background so that they appear closer to the user.

User options that have focus are typically of a certain type, e.g., all play-related options for audio such as play, fast-forward, record, stop, fast-backwards or, e.g., a list of songs from which a selection can be made, etc. It is also sometimes possible that more than one type of user options have focus at the same time.

Another method to deal with many options and buttons on a GUI is to enlarge them when the user needs to select a desired function, e.g., in a sub-menu. The sub-menu, in this context, can comprise one or more user selectable options. In case the sub-menu comprises more than one user selectable options, these options are usually of a similar type or are grouped for other specific reasons. This method of enlarging options and buttons on a GUI is described in patent application US S/N 09/062,364 (attorney docket PHA 23,387), incorporated by reference in its entirety herein.

Another aspect of the invention is that user options, which are currently not relevant to the user, can be less explicitly shown in the GUI. For instance the graphical designer can make use

of lower contrast, smaller object size or provide, at most, limited additional information (e.g., by using fewer textual or non-textual details) for options that do not have focus. Using animations, e.g., by 2.5D or 3D effects, the graphical designer  
5 can also make use of dynamical effects to make options unobtrusive (or even hide options) that have lost focus. Animation is a simulation of movement created by displaying a series of bitmaps. The animation lets the user perceive the change as a smooth transition. Thus the impression is avoided of an abrupt  
10 confrontation with a new layout. Further information about animations is found in patent application US S/N 09/128,839 (PHA attorney docket 23,469), incorporated by reference in its entirety herein. For example the GUI can have a panel with a set of options that loses focus, flip around such that the rear side, with a  
15 different set of options, gets the focus. The options that have lost focus can become completely invisible or remain partly visible with, e.g., a limited size, less contrast, semi-transparent with its background etc. In another example, the graphical designer might choose to use a pictorial representation  
20 (e.g., an icon) for options that have lost focus. An icon can be a metaphoric representation of the sub-menu. In yet another example, the graphical designer might choose to use the background art or background motive as a graphical representation for options that have lost focus. Especially in the latter example, animation can  
25 be used as a way to show the transition between the prominent an unobtrusive manner of displaying the user options that have lost focus. A combination of any of the techniques described before, to show user options less explicitly, is envisioned as well.

Yet another aspect of the invention is that user options  
30 which get focus can emerge from the background and become bigger or get more contrast or get more detailed with, e.g., additional textual information. Since the options were already shown in an

unobtrusive way on the GUI, the user had already notion of their existence. Another advantage of this GUI is that options, which have focus, can make very effective use of the limited screen real estate, thus making them effective and easy to use.

5       Vice versa, options that lose user focus can submerge from the foreground into the background and can, e.g., become semi-transparent, etc. In other words, options that lose focus become less intrusive or unobtrusive. An advantage to have these options still visible in the background is to give the user the notion  
0       that they are still available at a later stage. Typically the possibility that those options will be needed soon again is large.

Menu options are distributed and designed in a nested menu, e.g., in a hierarchy of (sub-) menus. Different levels of hierarchy are represented in different graphical manners so as to  
5       let user concentrate on a (sub-) menu with the most focus, but with a previous menu level (and possibly next menu level) present with less focus.

#### **Brief description of the drawings:**

10       The invention is explained using some schematic diagrams of an input device and some GUI screenshots, by way of an example, and with reference to the accompanying drawing wherein:

Fig. 1 is a diagram of a remote control, which can be used as a user input device according to this invention.

25       Fig. 2 is a schematic diagram illustrating a GUI screenshot with some elements that have a strong sense of place.

Fig. 3 is a schematic diagram illustrating a GUI screenshot with elements that have lost focus.

Fig. 4 is a schematic diagram illustrating a GUI screenshot  
30       when content is being played.

Fig. 5 is a schematic diagram illustrating a GUI screenshot with the palette tool flipped around.

Fig. 6 is a schematic diagram illustrating a GUI screenshot with highlighted function menu.

Fig. 7 is a schematic diagram illustrating a GUI screenshot of the function Web store with some deeper level user options.

5

**Detailed description of the drawings:**

Fig. 1 is a schematic diagram illustrating a RC 100, which can be used as a user input device according to this invention. RC 100 comprises a numerical keypad 102, which can be used for direct  
10 digit entry, e.g., for CD track selection. It also comprises a cursor control keypad 104 (with Up, Down, Right and Left keys) and an OK button 106. By using the keypad 104 the user can, e.g., navigate, over GUI highlights on a TV screen, to a desired option. The 'OK'-button 106 can be pushed to express the user's choice  
15 after arriving at the desired option. The user, to navigate back to a previous GUI screen and/or user option(s) screen, can use a back button 108. Button functions 110 can be used by the user, e.g., to activate the displaying of certain functions. Because of the very constrained screen area for the GUI, on, e.g., a TV  
20 screen, certain functions can not be shown, at least not in full exposure, at all times.

Transport controls 112 can be used by the user to facilitate actual enjoying a music collection.

Fig. 2 is a schematic diagram illustrating GUI screenshot 200  
25 with some elements that have a strong sense of place. Parts of screenshot 200 are a text feedback 202, a physical anchor 204, a genre 206, an owner 208, a palette tool 210 and a transport indicator 212.

Because of the spatial constraints of this type of interface  
30 (i.e., most of all content exists visually on a single screen) it is very important for the user to have a strong sense of place and a sure sense of where they are in the interface. To provide this,



two main anchors exist in GUI screenshot 200 to provide the user with text feedback 202 (e.g., album selection: Madonna "Ray of Light") in addition to physical anchor 204. Using physical anchor 204 the GUI designer tries to show the user a metaphor of a physical music collection (a stack of CDs is shown). As CDs are selected from the stack, their title or other relevant information can be displayed in the upper left corner as text feedback 202.

Another key element of the user interface is the management of the relationship between the owner of the collection and the genre or category of music (e.g., rock, jazz, opera, etc...). Because the music collection can be divided in groups, such as by the owner, it is very important for the user to be able to control the resulting views smoothly and independently. It can be divided according to ownership, illustrated by owner 208, but also according to genre (with the ability to create customized genres). Although the music can be divided using numerous criteria, in this example only two types of divisions are used. It is noted that the division of the music collection can contain overlaps.

Because of the relationship between owners and genres, the palette tool 210 is actually two-sided in the described example. By e.g., using animation, the flipping between the sides can be visualized thereby giving the user a strong sense of existence of both sides and thus of the relationship. The user can, in the example, flip the palette from owner and get the genre palette side.

Another key element of the user interface is the omnipresence of the transport indicator 212 (i.e., play, pause, fast forward, stop, and rewind). Because the most important reason to have this interface is to facilitate users actually enjoying their music collection, at all times the user must have the ability to play music.

Fig. 3 is a schematic diagram illustrating a GUI screenshot 300 with elements that have lost focus. Parts of screenshot 300 are a lost focus palette tool 310, a physical anchor 204, a genre 206, an owner 208, unobtrusive tool buttons 306, a user selection 308 and a transport indicator 212.

Certain elements of the GUI are regarded a helpful part, even though they might have lost focus at a particular moment. Also certain elements might soon become relevant to the user or might soon get focus. Because of the very constrained screen area certain techniques have to be applied to make or keep the user aware of these elements. Techniques that are proposed by the inventor are, e.g., 2.5 and 3D animation and movement of GUI elements, resizing and changing contrast of GUI elements to their background. Another aspect of the invention is a technique proposed to make GUI elements natural parts of their GUI screen background. For example unobtrusive tool buttons 306 are present in the background and natural parts of the background until the user decides he/she needs a tool. The tool buttons 306 are currently unobtrusively present since, e.g., it is anticipated that the user needs them soon. As pointed out earlier, this can be a consequence of a hierarchical menu with layers of sub-menus. A tool might very well be used in one of the next user actions. In yet another example, palette tool 210 of GUI 200 can physically not be present in its selectable condition because of the competing presence of the content (which here takes precedence). Therefore it has been resized to lost focus palette tool 310. Due to its new size the buttons of the lost focus palette tool 310 are not labeled any more. Depending on resources available for the GUI, the transition of tool 210 to lost focus palette tool 310 can be achieved with an animation movement and/or a dynamic resizing animation.

Fig. 4 is a schematic diagram illustrating a GUI screenshot 400 when content is being played. Parts of screenshot 400 are a text feedback 402, a physical anchor 204, a genre 206, an owner 208, a lost focus palette 310, a user selection 404 and an active transport indicator 406.

In screenshot 400 the user is given unambiguous feedback by highlighting an element from the transport indicator 406, in this example the play function. Text feedback 402 and user selection 404 provide textual feedback to the user. In screenshot 400 the name of the user/owner is shown using owner 208.

Fig. 5 is a schematic diagram illustrating a GUI screenshot 500 with the palette tool flipped around. Parts of screenshot 500 are a text feedback 202, a physical anchor 204, a genre 206, an owner 508, a palette tool 510 and a transport indicator 212.

In screenshot 500 the palette tool 510 has two sides/views. It is however important to give the user the illusion of the existence of other view. In screenshot 500 this is achieved by showing a slightly tilting palette tool 510. Another example of giving the user the illusion of the existence of other views would be the use of tabs (not visualized). When changing from one view of the palette tool 510 to another view the user can also be made aware of the other side, e.g., by means of animation in which the palette tool is flipped smoothly. It is also possible to extend the number of views to a higher number.

Fig. 6 is a schematic diagram illustrating a GUI screenshot 600 with a highlighted function menu. Parts of screenshot 600 are an owner 608, a lost focus palette 310, a physical anchor 204, a genre 206, tool buttons 606, a user selection 610 and a transport indicator 212.

In screenshot 600 the button "add to playlist" of the tool buttons has gotten focus. This can be the result of a user action such as pressing functions button 110 on remote control 100. This

as opposed to screenshot 300 where the tool buttons 306 are currently semi visible and can e.g., be even part of a background picture or pattern. In screenshot 600 the user now gets a clear feedback that certain tool buttons are available. For instance the contrast of tool buttons might be larger, the button that has currently focus might be highlighted and the user might be able to browse the buttons using cursor control keypad 104.

Fig. 7 is a schematic diagram illustrating a GUI screenshot 700 of the function Web store with some deeper level user options. Parts of screenshot 700 are a shop items bar 702, similar shop items 704, a Web-store button 706 and a Web-store button sub-menu 708.

Screenshot 700 might be a next screen after the user browsed over tool buttons 606 and pressed the OK button 106 when the button "Web-store" was highlighted. The user's focus can now be to make a selection from merchandise displayed in items bar 702. As a consequence, GUI screenshot 700 mainly show elements relevant to the current user's focus although certain user options might still be semi visible parts of the background.

20

What is claimed is:

1. A method of displaying a menu with a GUI for representing a plurality of user-controllable options, comprising:
  - 5 - at least two sub-menus,  
wherein:  
a user can select a specific one of the sub-menus;  
upon selection, the specific sub-menu is graphically represented in a prominent manner and an other sub-menu is graphically  
0 represented in an unobtrusive manner.
2. The method of claim 1, wherein said unobtrusive manner is achieved by using at least one of the following techniques:
  - representing the other sub-menu with a higher degree of  
15 semi-transparency, compared to the specific sub-menu, with respect to a background;
  - representing the other sub-menu with a lower degree of contrast and the specific menu with a higher degree of contrast.
- 20 3. The method of claim 1, wherein said unobtrusively manner is achieved by displaying said other sub-menu as being part of at least:
  - a background motive;
  - a background graphics art.
- 25 4. The method of claim 1, wherein said unobtrusive manner is achieved by using at least one of the following techniques:
  - representing the other sub-menu using a smaller size and the specific sub-menu with a bigger size;
  - 30 - representing the other sub-menu using fewer details and the specific menu using more details.

5. The method of claim 4, wherein a pictorial graphical representation is used for displaying the other sub-menu.

6. A data processing device with a GUI for representing a plurality  
5 of user-controllable options, comprising:

- at least two sub-menus,

wherein:

a user can select a specific one of the sub-menus;

upon selection, the specific sub-menu is graphically represented

0 in a prominent manner and an other sub-menu is graphically  
represented in an unobtrusive manner.

7. The data processing device of claim 6, wherein said unobtrusive  
manner is achieved by using at least one of the following

5 techniques:

- representing the other sub-menu with a higher degree of  
semi-transparency, compared to the specific sub-menu, with respect  
to a background;

- representing the other sub-menu with a lower degree of

10 contrast and the specific menu with a higher degree of contrast.

8. The data processing device of claim 6, wherein said  
unobtrusively manner is achieved by displaying said other sub-menu  
as being part of at least:

25 - a background motive;

- a background graphics art.

9. The data processing device of claim 6, wherein said  
unobtrusive manner is achieved by using at least one of the  
30 following techniques:

- representing the other sub-menu using a smaller size and  
the specific sub-menu with a bigger size;

- representing the other sub-menu using fewer details and the specific menu using more details.

10. The data processing device of claim 9, wherein a pictorial  
5 graphical representation is used for displaying the other sub-menu.

11. A method of enabling a user to interact with a GUI for representing a plurality of user-controllable options, comprising:  
0 - at least two sub-menus,

wherein:

a user can select a specific one of the sub-menus;  
upon selection, the specific sub-menu is graphically represented in a prominent manner and an other sub-menu is graphically  
15 represented in an unobtrusive manner.

12. The method of claim 11, wherein said unobtrusive manner is achieved by using at least one of the following techniques:  
- representing the other sub-menu with a higher degree of  
20 semi-transparency, compared to the specific sub-menu, with respect to a background;  
- representing the other sub-menu with a lower degree of contrast and the specific menu with a higher degree of contrast.

25 13. The method of claim 11, wherein said unobtrusively manner is achieved by displaying said other sub-menu as being part of at least:

- a background motive;
- a background graphics art.

30

14. The method of claim 11, wherein said unobtrusive manner is achieved by using at least one of the following techniques:

- representing the other sub-menu using a smaller size and the specific sub-menu with a bigger size;
- representing the other sub-menu using fewer details and the specific menu using more details.

5

15. The method of claim 14, wherein a pictorial graphical representation is used for displaying the other sub-menu.

16. A SW application for representing a GUI for displaying a plurality of user-controllable options, comprising:

- at least two sub-menus,

wherein:

a user can select a specific one of the sub-menus;

upon selection, the specific sub-menu is graphically represented

5 in a prominent manner and an other sub-menu is graphically represented in an unobtrusive manner.

17. The SW application of claim 1, wherein said unobtrusive manner is achieved by using at least one of the following

20 techniques:

- representing the other sub-menu with a higher degree of semi-transparency, compared to the specific sub-menu, with respect to a background;

25 - representing the other sub-menu with a lower degree of contrast and the specific menu with a higher degree of contrast.

18. The SW application of claim 1, wherein said unobtrusively manner is achieved by displaying said other sub-menu as being part of at least:

- 30
- a background motive;
  - a background graphics art.



19. The SW application of claim 1, wherein said unobtrusive manner is achieved by using at least one of the following techniques:

- representing the other sub-menu using a smaller size and  
5 the specific sub-menu with a bigger size;
- representing the other sub-menu using fewer details and the  
specific menu using more details.

20. The SW application of claim 4, wherein a pictorial graphical  
10 representation is used for displaying the other sub-menu.

Fig. 1

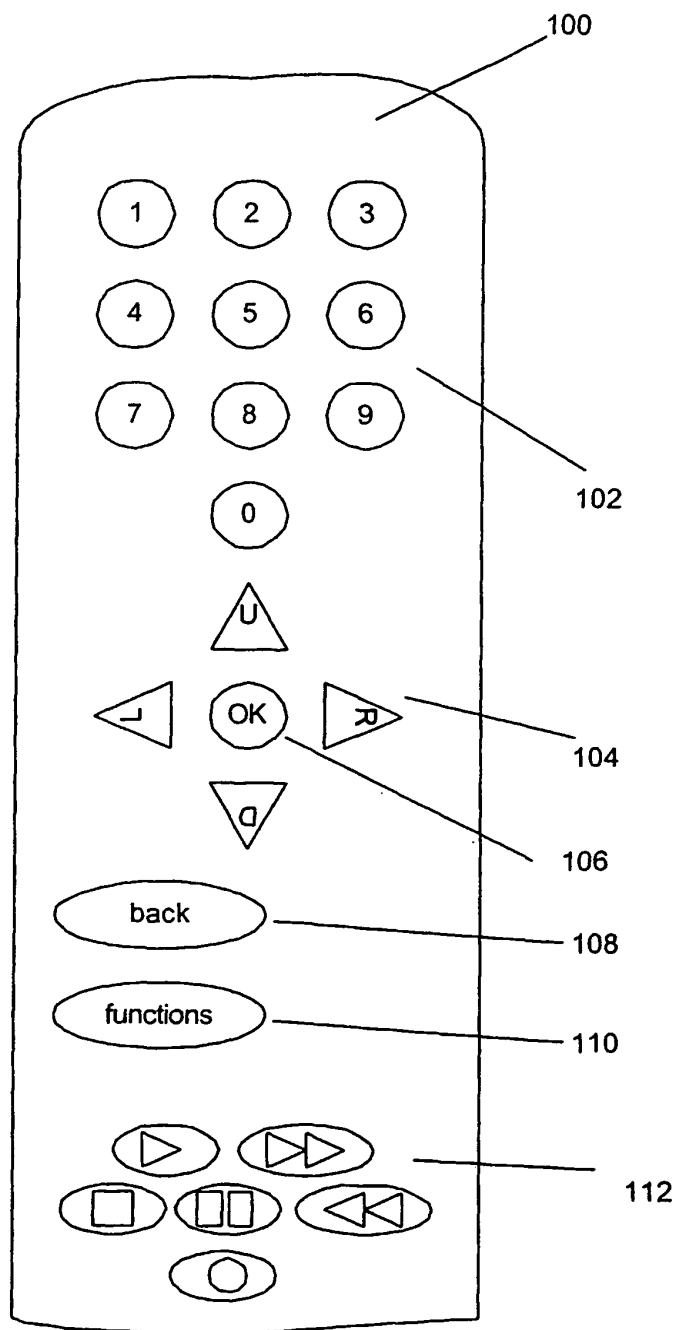


Fig. 2

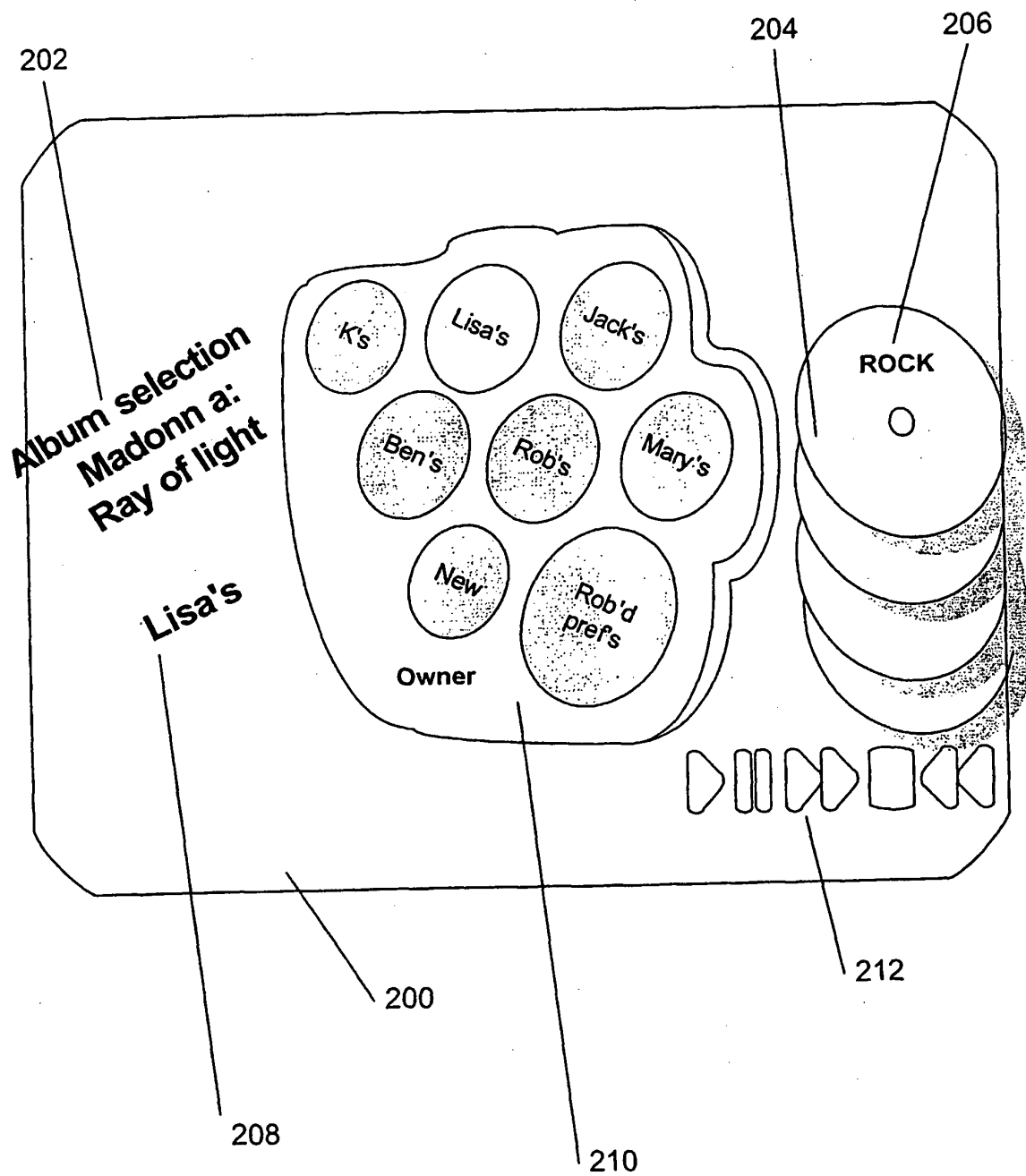


Fig. 3

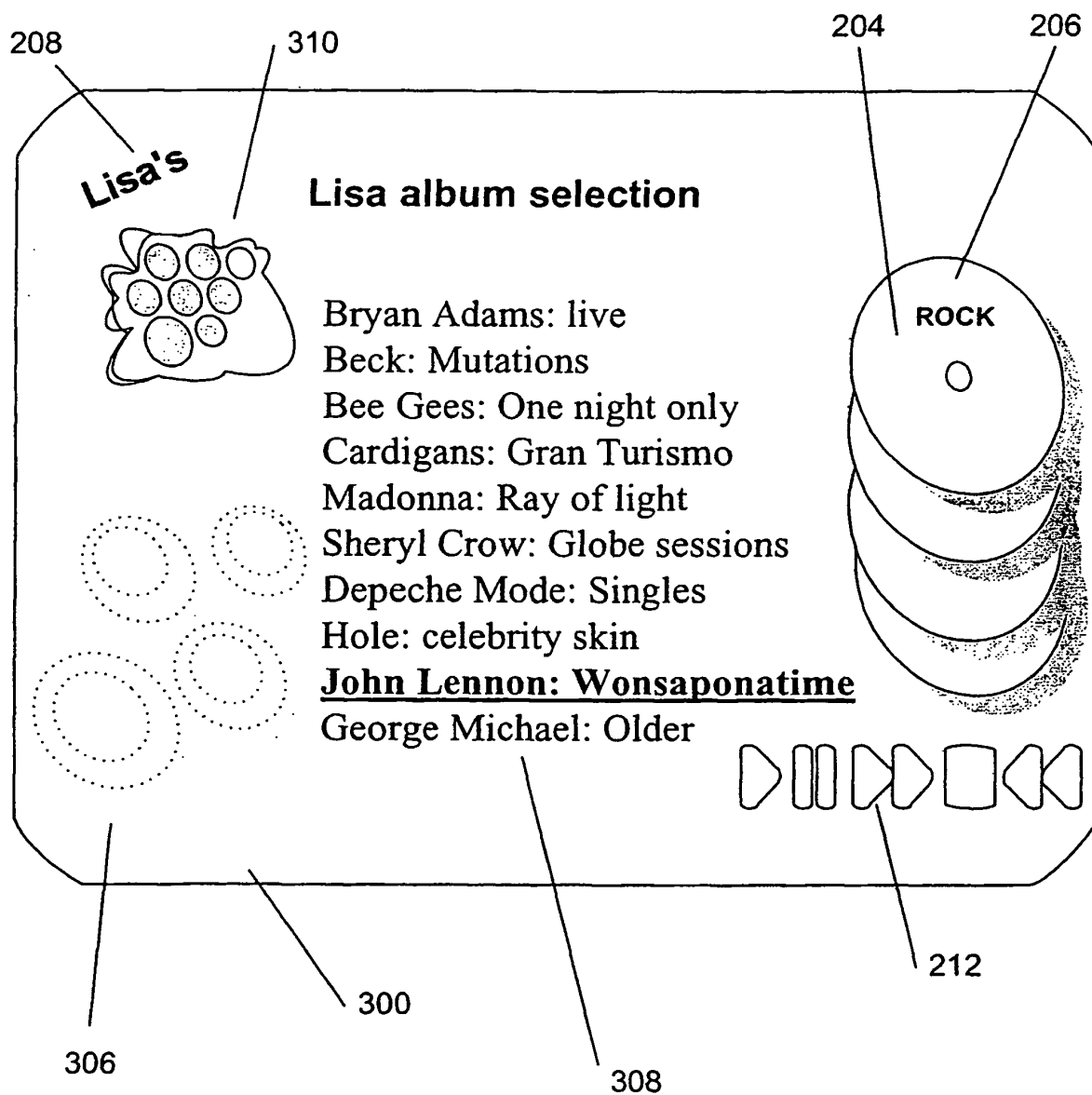


Fig. 4

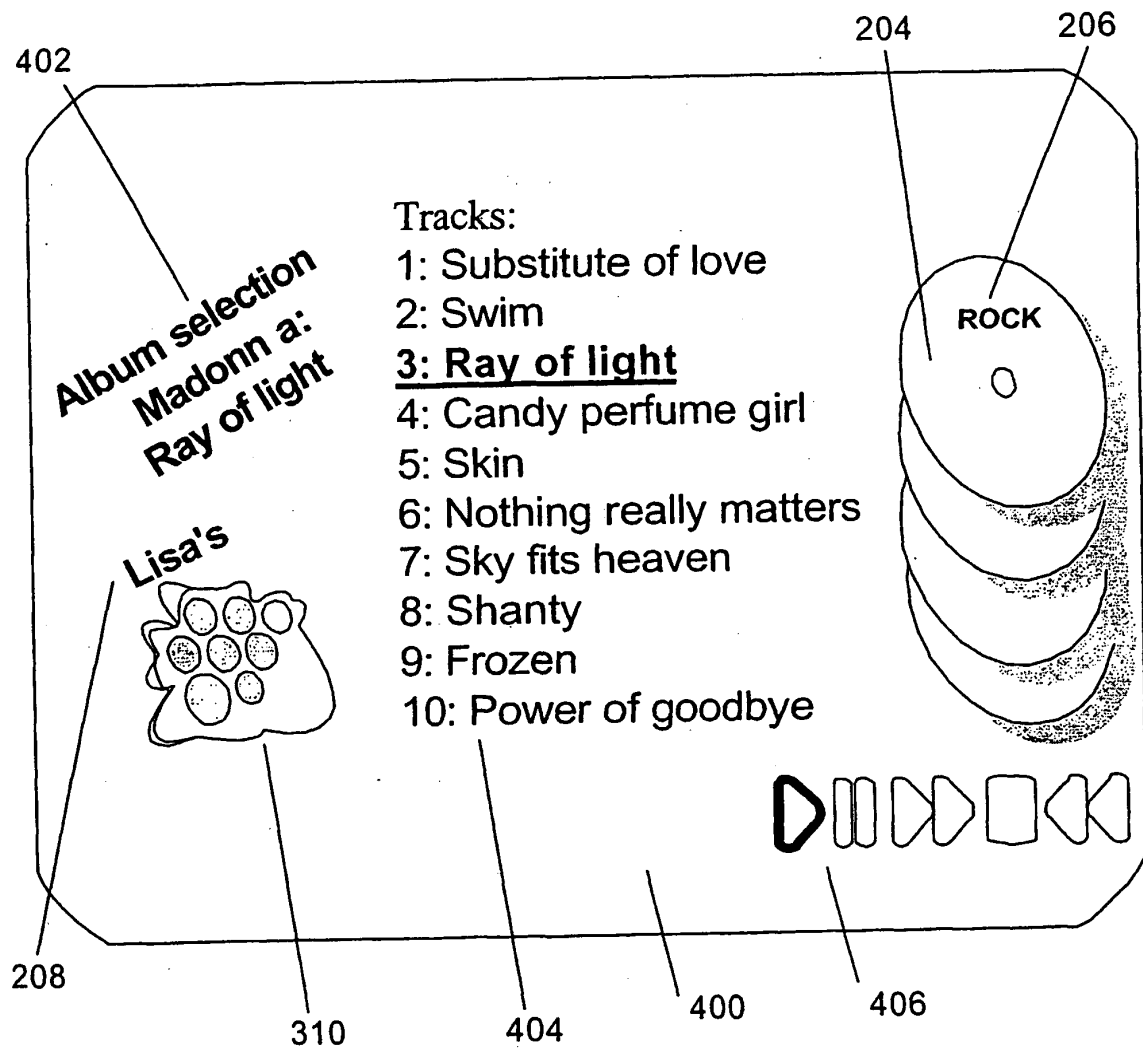


Fig. 5

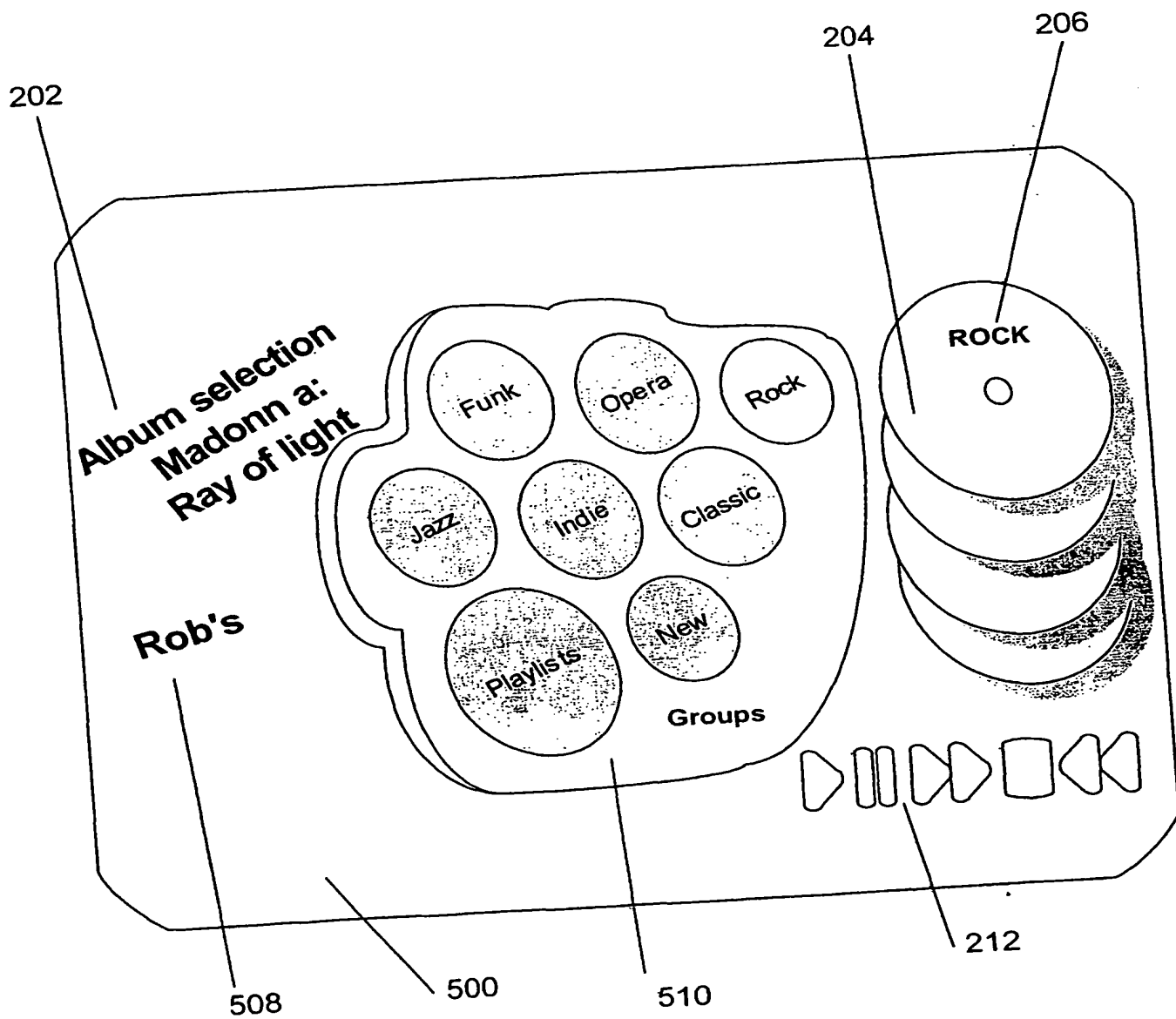


Fig. 6

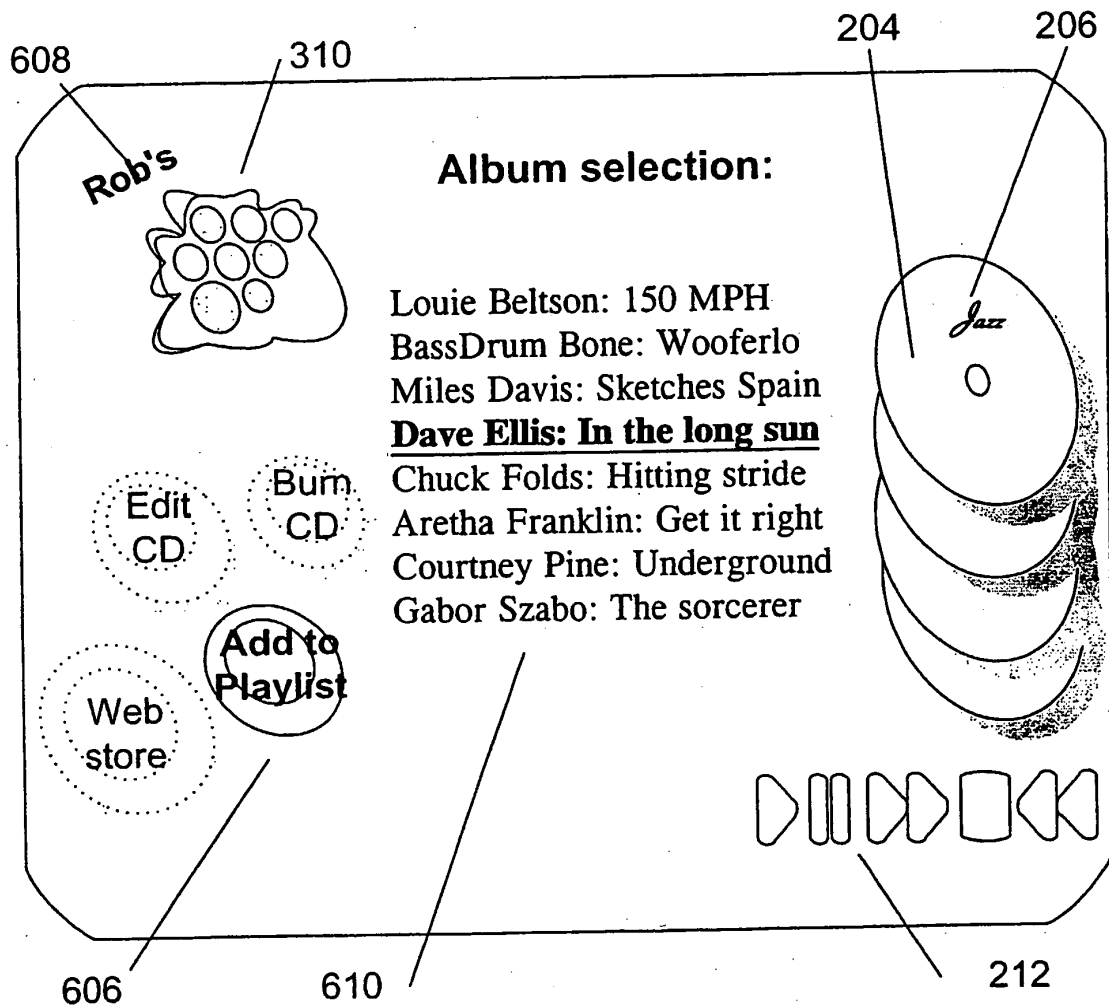
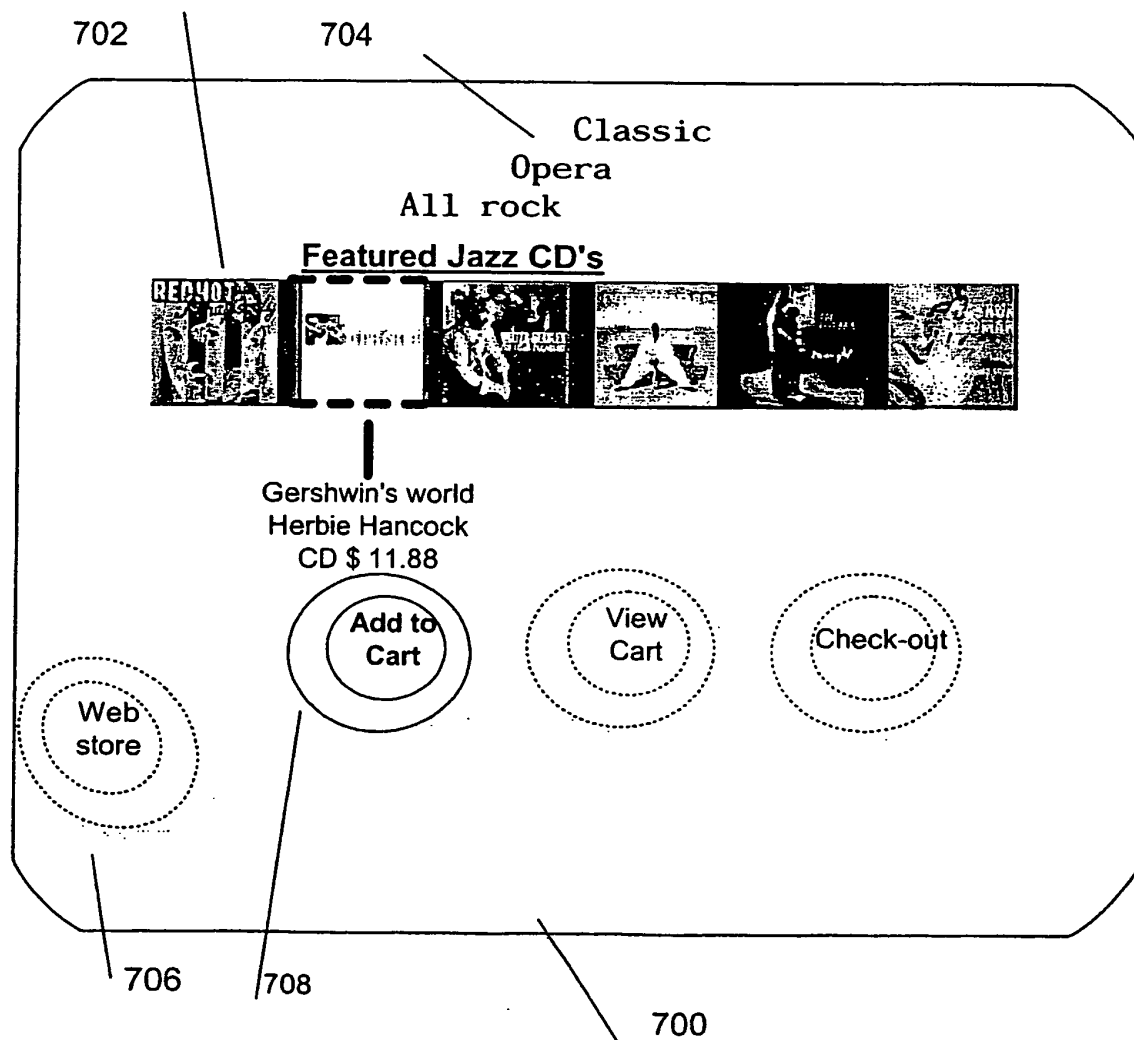


Fig. 7





## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/06470

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(7) :G06F 3/00

US CL :345/767, 810, 821, 841

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 345/581, 617, 764, 767, 802, 810, 815, 821, 822, 823, 841

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EAST, IBM, DIALOG

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 5,956,035 A (SCIAMMARELLA et al) 21 SEPTEMBER 1999, abstract; col. 1, lines 63-67; col. 2, lines 1-24; col. 3, lines 50-67; col. 4, lines 1-21, 26-30.	1, 4, 6, 9, 11, 14, 16, 19 ----- 2, 3, 5, 7, 8, 10, 12, 13, 15, 17, 18, 20
Y	US 5,745,109 A (NAKANO et al) 28 APRIL 1998, abstract; col. 4, lines 11-24; col. 5, lines 38-62; col. 6, lines 64-67; col. 7, lines 1-2, 33-36; col. 10, lines 46-64; col. 11, lines 13-21.	2, 3, 5, 7, 8, 10, 12, 13, 15, 17, 18, 20
A	6,049,336 A (LIU et al) 11 APRIL 2000, abstract; col. 2, lines 5-57.	1-20

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"A" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 14 JUNE 2002	Date of mailing of the international search report 18 JUL 2002
---	---

Name and mailing address of the ISA/US  
Commissioner of Patents and Trademarks  
Box PCT  
Washington, D.C. 20231  
Facsimile No. (703) 305-3930

Authorized officer

X. L. BAUTISTA

Telephone No. (703) 305 3921

Form PCT/ISA/210 (second sheet) (July 1998)\*

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US02/06470

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,745,116 A (PISUTHA-ARNOND) 28 APRIL 1998, abstract; col. 1, lines 60-67; col. 2, lines 1-15.	1-20
A	US 5,543,857 A (WEHMEYER et al) 06 AUGUST 1996, abstract; col. 1, lines 52-67; col. 2, lines 1-22.	1-20
A, P	US 6,266,098 B1 (COVE et al) 24 JULY 2001, abstract; col. 52-67; col. 2, lines 1-27.	1-20
A	US 5,912,668 A (SCIAMMARELLA et al) 15 JUNE 1999, abstract; col. 1, lines 41-67; col. 2, lines 1-4.	1-20
A, P	US 6,314,570 B1 (TANIGAWA et al) 06 NOVEMBER 2001, abstract; col. 2, line 18-col. 9, line 44.	1-20
A	US 5,542,024 A (BALINT et al) 30 JULY 1996, abstract; col. 2, lines 27-col. 4, line 28.	1-20

Form PCT/ISA/210 (continuation of second sheet) (July 1998)\*

This Page is inserted by IFW Indexing and Scanning Operations and is not part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☐ BLURED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLORED OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REPERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images problems checked, please do not report the problems to the IFW Image Problem Mailbox**

**THIS PAGE BLANK (USPTO)**